Revision of the Scarabaeidae: Anomalinae
2. An Annotated Checklist of *Anomala* for the United States and Canada

(Coleoptera)

Robert W. L. Potts
California Academy of Sciences, San Francisco, California

It has been 60 years since the last general study was published for the *Anomala* of our area. The review by Thomas Casey in 1915, while in key form, was scarcely helpful in identification. Basic keys to the species were those of Horn (1884), and Schaeffer (1907). The few subsequent studies have been limited in scope, or only descriptions of new species.

In our study we reviewed all original descriptions, and in order to simplify direct comparisons with specimens and related species, we rearranged these to follow a standard form. We examined the Schaeffer and Casey Types[1], and also Types or Co-types of the Bates and Wickham species. Finally, we identified or re-identified specimens from 30 collections, totalling well over 12,000 specimens.

Of the more than 80 names applied or mis-applied to *Anomala* in our area we accept only 33 as valid, with 2 further names applied as subspecies. Our study adds 7 new species and 3 new subspecies. The following checklist gives the necessary changes in synonymy, and also lists States and Provinces from which specimens were seen.

A study of this nature must always depend on the very generous and much appreciated assistance of a considerable number of institutions and individuals: California Academy of Sciences (Hugh Leech); California Department of Agriculture (Fred Andrews); California State University, Long Beach (Eric Fisher); Canadian National Collection (Henry Howden); North Dakota State University (Richard Post, Paul Lago); Oregon Department of Agriculture (Richard Westcott); Oregon State University (Paul Ritcher, Dave Carlson); Southwestern Research Station (Vincent Roth); Texas A & M University (Horace Burke); Texas Tech University (Charles O'Brien); U.S. National Museum (Robert Gordon); University of Arizona (Floyd Werner); University of California, Berkeley (John Chemsak); University of California, Riverside (Saul Frommer); University of Georgia (Robert Turnbow, Jr.); University of Nebraska (Brett Ratcliffe); University of Wisconsin (Lutz Bayer). In addition, I am most grateful for the loan of personal collections from Rolf Aalbu, John Baker, Dave Carlson, Claude

[1]Casey did not designate types. This was done subsequently by L. L. Buchanan while rearranging the Casey collection when it was incorporated into the National Museum collection, but the designations were not published. Casey described most of his proposed taxa from single specimens, which should be Holotypes, but Lectotypes should be selected in the other cases, and the data should be published to meet the requirements of the International Code. We considered this impossible without a visit to the National Museum to consider the entire Casey collection of Anomalinae.

Chantal, Joseph Cicero, Alan Hardy, Henry Howden, Ron McPeak, Gayle Nelson, Brett Ratcliffe, Robert Turnbow, Jr., Norman Woodley, and Robert Woodruff. Also, I am particularly indebted to Joe Cicero for sharing his extensive knowledge of collecting sites through the Southwest, and to Alan Hardy for assistance in numerous ways, including taking us into the dunes at Glamis, and furnishing a number of references.

Annotated Checklist of Anomala of the United States and Canada

Anomala adscita (Robinson) 1941:132. **New Combination.**

Rhombonalia adscita Robinson 1941:132.

Distribution: AZ, Coconino Co.

Anomala antennata Schaeffer 1906:1.

Distribution: southern NM, western TX.

Anomala arida Casey 1915:29.

The female of these first three species and of a considerable number of the species that follow has not been described. However, in the Anomalinae the female often differs only in the sexual characters, such as the antennal club, protibiae, and larger protarsal claws, otherwise fitting well within the range of variation. Even though so many species were described from a single sex, usually the male, it would seem pointless to attempt meaningful description, or to designate types in all these cases.

Distribution: southern AZ.

Anomala binotata (Gyllenhal) 1817:106.

Melolontha binotata Gyllenhal 1817:106.

Euchlora maculata Laporte 1840:136.

Anomala unifasciata Say 1825:199.

Anomala marginella LeConte 1854:81.

Anomala compacta Casey 1915:15. **New Synonymy.**

Distribution: AL, AR, CO, CT, DE, DC, GA, IL, IN, IA, KS, KY, LA, MD, MI, MN, MO, MS, NB, NJ, NY, NC, OH, OK, PA, RI, SC, TN, TX, VA, WI, and Ontario. (Leng record for NM was a mistake. It applied to *marginella* and LeConte clearly stated the specimens were from WI, even though it was described in a paper on species from the Mexican border.)

Anomala butleri (Howden) 1955:258. **New Combination.**

Rhombonalia butleri Howden 1955:258.

Distribution: AZ, Dragoon Mountains.

Anomala carinifrons Bates 1888:249.

Anomala camancha Wickham 1913:29. **New Synonymy.**

Only one of six Cotypes in the Wickham series has a moderately impressed clypeal suture, while the others vary from slightly to not at all impressed. Wickham's unequivocal "deeply impressed" is extremely misleading, and does not constitute a real difference.

The female is distinctive and has not been previously noted: similar to male in coloration and sculpture except the clypeus is nearly evenly rounded, without anterior truncation, nearly in same plane as frons but separated by a thin raised carina at suture, crowded punctures larger, more distinct. Pronotum more sparsely, less strongly punctate. Pygidium with only faint indication of punctures and incised strigulae.

Antennal club notably ovate, not contorted, about length of stem. AZ, Cochise Co., Douglas, 8 Aug. 68, in author's collection. (Another female in USNM with clypeal suture not as carinate, another in Cicero Coll. with suture perfectly flat.)

Distribution: southeastern AZ, southern NM, western TX.

Anomala carlsonl Hardy 1976:365.

Distribution: So. CA.

Anomala castanlceps Bates 1888:248.

Anomala lurida Horn 1884:161, in part.

This species was confused with what is now *nimbosa* Casey, and both were included by Horn under the invalid Fabrician name, *lurida,* which is also sometimes ascribed to Burmeister.

Distribution: southern AZ.

Anomala cavlfrons LeConte 1868:52.

Anomala apacheana Wickham 1913:30. **New Synonymy.**
Rhombonalia comes Casey 1915:6. **New Synonymy.**
Rhombonalia cochiseana Casey 1915:7. **New Synonymy.**
Rhombonalia transversa Casey 1915:7. **New Synonymy.**

Casey had a genius for describing the superficial characters most likely to be widely variable, using comparatives with abandon that had little or no precise meaning. Wickham, however, avoided comparing non-existent differences by an interesting sleight of hand switch, comparing *apacheana* with *camancha,* a synonym of the quite different *carinifrons,* rather than with *cavifrons.*

Distribution: AZ, CO, KS, NB, NM, OK, TX.

Anomala delicata Casey 1915:27.

Anomala centralis Horn 1884:159, in part.
Anomala inconstans Schaeffer 1906:2, in part.
Anomala moquina ♂ Casey 1915:31. **New Synonymy.**
Anomala papagoana Casey 1915:30. **New Synonymy.**

Both Horn and Schaeffer failed to recognize the species was different, mistakenly including it with previously described valid species. It is our most variable and widespread Southwestern species, and Casey compounded confusion by attempting to describe it as three species. It seems unfortunate that *delicata* is the first of these, as the typical specimen is far from delicate. Casey's *moquina* was described from an alleged pair, the male a synonym here, the quite different female belonging to *digressa* Casey.

Distribution: southern AZ, from Baboquivari Mtns. east, southern NM, western TX.

Anomala diabla Potts 1976:220.

Distribution: central Rio Grande River Basin, TX.

Anomala digressa Casey 1915:27.

Anomala sagax Casey 1915:30. **New Synonymy.**
Anomala moquina ♀ Casey 1915:31. **New Synonymy.**

Distribution: middle and southern AZ.

Anomala dubia (Scopoli) 1763:3.

Scarabaeus dubia Scopoli 1763:3.

Distribution: NJ (introduced from Europe).

Anomala ellipsis Casey 1915:15.

Anomala luteipennis Horn 1884:159, in part.

Horn again failed to recognize a new species and included it with the *luteipennis*

of LeConte.

Distribution: south-central AZ, western NM.

Anomala exigua (Schwarz) 1878:362.

Strigoderma exigua Schwarz 1878:362.

Distribution: FL, Sumter Co. (Probably extinct; has never been collected again.)

Anomala eximia Potts 1976:221.

Distribution: FL, Highlands Co.

Anomala flavilla Bates 1888:227.

Anomala parvula Horn 1884:158, in part.
Anomala tenera Casey 1915:37. **New Synonymy.**
Anomala flavilla centralis, Saylor 1948:354.

Casey's attempt to separate *tenera* is difficult enough to understand, but then Saylor completely misidentified the species and applied LeConte's name, *centralis,* to it even though *flavilla* is a distinctive species that couldn't possibly fit LeConte's original description of *centralis.*

Distribution: CA and AZ, lower desert areas.

Anomala flavilla coachellae, new subspecies.

Holotype male and Allotype: very similar to *flavilla* in all respects except the pronota immaculate or nearly, without the well-developed paired dark maculae of the typical subspecies. (Variation in 59 male, 22 female paratypes ranges from the immaculate to showing faint or small paired maculae with one or two possibly indistinguishable from the typical.)

Holotype and Allotype: CA, Riverside Co., Coachella, 13—14 May 1917, E. P. VanDuzee, Collr. (CAS). Paratypes all from CA, Riverside Co., the following localities: 3♂, 1♀, Coachella, 27 May 1928, E. C. VanDyke, Collr. (CAS); 12♂, 5♀, SW Coachella, May—June 1973, 1974, H. Cousins, Collr. (Potts); 17♂, 7♀, Coachella Valley, 31 May 1962, Neal, Collr. (OSU); 2♂, same except 31, June 1962 (OSU); 9♂, 7♀, Indian Wells, 4 May 1957, R. Westcott, Collr. (ODA); 1♀, Indio, 1 June 1939, E. Ross, Collr. (CAS); 1♂, Palm Desert, 22 May 1970, A. Hardy, Collr. (Hardy); 1♂, Boyd Desert Res. Center, 15 May 1969, Frommer & Le Pre, Collrs. (UCR); 8♂, 1♀, Palm Springs, 29—30 May 1954, Menke & Stange (Woodruff); 1♂, same except 22 May 1955 (Woodruff); 2♂, Palm Springs, 30 May 1939, E. Ross, Collr. (CAS); 1♂, 2 mi. S. Palm Springs, 2 June 1968, F. Hovore, Collr. (OSU); 2♂, 1000 Palms Canyon, 21 Apr 1974, Cicero, Collr. (Cicero). Holotype and Allotype in Calif. Acad. Sci.; paratypes there also, and in the collections of Oregon Dept. Agric.; Oregon State Univ.; Univ. Calif., Riverside; J. M. Cicero; Alan Hardy; Robert Woodruff; Gayle Nelson, and the author.

Within California and Arizona *flavilla* never becomes very darkly and broadly marked as it does south to Central America, but the immaculate segment of the population, at the extreme northern limits of its distribution, appears geographically isolated north of the Salton Sea.

Anomala flavipennis Burmeister 1844:249.

Anomala dichroa Melsheimer 1844 (1845):140.
Anomala flavipennis modulata Casey 1915:23. **New Synonymy.**
Anomala flavipennis amissa Casey 1915:24. **New Synonymy.**

Typical *flavipennis* are distinguished as most commonly with pronotum moderately dark red-brown, elytra lighter reddish-yellow-brown except strial punctures sometimes red-brown, punctures of intervals paler or not colored; varying to pronotum brownish or greenish black to black, sometimes a slight metallic gloss, sometimes elytra somewhat clouded darker, usually as diffuse spots or streaks; averaging 10—12 mm.

Distribution: AL, AR, FL, GA, IL, IN, KS, LA, MD, MS, NB, NJ, NM,, NC, OH, OK, SC, TX, and VA.

Anomala flavipennis aransas, new subspecies.

Holotype male: pronotum blackish, elytra smoky-brown with punctures of intervals equally as strongly colored as those of striae; 10—12 mm. Holotype and 9 male paratypes; TX, Aransas Co., Goose Island State Park, 14 June 1968, J. R. Heitzman, Collr. (Woodruff). Holotype in collection of Robert Woodruff, on permanent loan to Calif. Acad. Sci.; paratypes in collections of U.S. Nat. Museum, Robert Woodruff, and the author.

Anomala flavipennis luteipennis LeConte 1854:80.

Anomala luteipennis LeConte 1854:80.
Anomala stigmatella Casey 1915:22. **New Synonymy.**
Anomala kansana Hayes & McColloch 1924:138. **New Synonymy.**

Casey redescribed specimens from Kansas in which spots of the 3rd and 5th elytral intervals were elongated into streaks, and subsequently Hayes & McColloch re-redescribed specimens from the same area with the same elongated streaks, thoroughly confusing the identification of this subspecies.

The typical variation is: pronotum dark red-brown to black, sometimes faintly metalic; elytra with dark brown to black maculations on a more yellowish ground color as spots, streaks or cloudings, particularly on 3rd and 5th intervals, but varying widely from obsolescent to entirely dark brown-black, however darker specimens often with pale band posterolaterally and paler streakings through disc, lighter specimens with strial punctures moderately colored, sometimes forming distinct thin lines, punctures of intervals less strongly or not colored: 9—13 mm.

Distribution: KS, NB, OK, TX.

Anomala flavipennis okaloosensis, new subspecies.

Holotype male: pronotum dark brownish-black, elytra immaculate yellowish brown, with strial punctures uncolored or spots extremely fine, the punctures of intervals uncolored or, rarely, very finely colored; antennal club appears to be slightly longer proportionately than in the typical subspecies; 9—11 mm.

Holotype male and 2 male paratypes: FL, Okaloosa Co., Dustin, 18 May 1960, Woodruff, Collr. (Woodruff); 19 male paratypes, FL, Okaloosa Co., 5 mi. W. Miramar Beach, sand dunes, 19 May 1969, H. Weems, Collr. (Woodruff); 5 male paratypes, FL, Santa Rosa Co., Navarre Beach, grassy dunes, 23 May 1971, H. Weems, Collr. (Woodruff). Holotype in collection of Robert Woodruff, on permanent loan to Calif. Acad. Sci.; paratypes in collections of U.S. Nat. Mus., Calif. Acad. Sci., Robert Woodruff, and the author.

Anomala flavipennis subquadrata Casey 1915:21. **New Status.**

Anomala subquadrata Casey 1915:21.

This subspecies is largely brownish-black, not distinctly bicolorous, with elytra often as dark as pronotum, at least in more or less basal half, sometimes punctures evidently colored in striae; consistently smaller, 8—10mm.

It is presently impossible to define the several subspecies on a truly sound basis, however, it is rather clear that *flavipennis* is in a greater than average state of flux, with certain localized centers of particular trends of variation, and it appears valid to recognize these populations as subspecies.

Distribution: GA, MD, NJ, VA, probably coastal or near.

Anomala foraminosa Bates 1888:229.

Distribution: southern TX.

Anomala hardyorum Potts 1976:221.

Distribution: CA, Imperial Co.

Anomala imperialae Potts 1976:222.

Distribution: southern AZ and Imperial Co., CA.

Anomala innuba (Fabricius) 1787:22.

Melolontha innuba Fabricius 1787:22.
Anomala minuta Horn 1884:159.
Anomala undulata Casey 1915:32. **New Synonymy.**
Anomala innuba piceola Casey 1915:35. **New Synonymy.**
Anomala medorensis Casey 1915:35. **New Synonymy.**

Casey completely confused the two species, *innuba* and *undulata,* although he properly referred *piceola* to *innuba,* and *medorensis* as closely related. (Also see discussion after *undulata* Melsheimer.)

Distribution: AL, AR, CT, DE, DC, FL, GA, IL, IN, IA, KS, KY, MD, MS, MO, NB, NJ, NM, NC, NY, OH, OK, PA, SC, TN, TX, VA, WI, and WV.

Anomala insitiva Robinson 1938:112.

Anomala polychalca Schaeffer 1906:2.

Schaeffer recognized the species, but placed it with a Mexican species.

Distribution: southern TX.

Anomala kanei Potts 1976:223.

Distribution: northern AZ and southern UT.

Anomala lucicola (Fabricius) 1798:132.

Melolontha lucicola Fabricius 1798:132.
Melolontha atrata Fabricius 1798:132.
Melolontha moerens Fabricius 1798:132.
Anomala quadrimaculata Drapiez 1820:276.
Euchlora nigritula Laporte 1840:137.
Anomala cinctella Burmeister 1844:269.
Anomala pinicola Melsheimer 1844 (1845):141.
Anomala phylloperthoides Nonfried 1894:122.

Distribution: CT, DE, DC, FL, GA, IL, IN, KY, MD, MA, ME, MI, NH, NJ, NY, NC, OH, PA, RI, SC, TN, VA, VT, and Ontario.

Anomala ludoviciana Schaeffer 1906:3.

Anomala pubescens Blatchley 1910:984.

Distribution: IL, IN, IA, KS, LA, MN, MS, NB, ND, OK, TN, TX, and Wi.

Anomala marginata (Fabricius) 1792:164.

Melolontha marginata Fabricius 1792:164.
Melolontha annulata Germar 1824:121.
Spilota incolumis Casey 1915:43. **New Synonymy.**

In many references the date of this Fabrician species has been given as 1775 rather than 1792, but this is incorrect, and the name therefore becomes a primary homonym of *Melolontha marginata* Herbst 1784:14 (now a synonym of *Rhizotrogus ruficornis* (F.)). Under the Code a new name is required, and the first synonym, *annulata* Germar, is available. However, *marginata* has been used in its present sense for 185 years, and Germar's *annulata* has stood as a synonym since 1844. It would seem both continuity and common sense suggest the preservation of the Fabrician name that has gone so long unquestioned, and the matter will be submitted to the International Commission on Zoological Nomenclature.

Casey's proposed species fits almost in the middle of the series of variation, certrainly one of his least distinctive species.

Distribution: AL, AR, DC, FL, GA, IN, KS, KY, LA, MD, MS, MO, NC, NJ, OH, SC, TN, and VA.

Anomala mendica Casey 1915:20.

Distribution: FL, GA, SC.

Anomala minuta Burmeister 1844:249.

Distribution: AL, FL, GA, NC, and SC.

Anomala nimbosa Casey 1915:26.

Anomala inconstans Schaeffer 1907:69.
Anomala lurida Horn 1884:161, in part.

Horn mistakenly placed the species under an invalid Fabrician name, and Schaeffer referred it to a Mexican species. It is quite possible that it should be placed as a subspecies of *inconstans* Burmeister, but the problem will be more completely studied in our consideration of the species in Mexico.

Distribution: southern AZ and NM.

Anomala oblivia Horn 1884:163.

Spilota oblivia maritima Casey 1915:47. **New Synonymy.**

Distribution: CT, DC, FL, GA, ME, MD, MA, MI, NJ, NY, NC, PA, SC, TN, and VA.

Anomala orientalis (Waterhouse) 1875:108.

Phyllopertha orientalis Waterhouse 1875:108.

Distribution: CT, NJ, NY (introduced from Asia).

Anomala parvula Burmeister 1844:247.

Distribution: FL, GA, MS, NC, and SC.

Anomala robinsoni Potts 1974:150.

Pachystethus floridana Robinson 1941:133.

Distribution: FL.

Anomala sabinae Potts 1976:224.

Distribution: AZ, Sabino Canyon.

Anomala semilivida LeConte 1878:403.

Anomalepta flaccida Casey 1915:10. **New Synonymy.**

Distribution: AL, FL, GA, NC, and SC.

Anomala tibialis Schaeffer 1906:5.

Known from Type only, the exact locality unknown. If the species has not been driven to extinction by progress, it is likely to be found associated with a more or less sandy area in the state.

Distribution: TX.

Anomala suavis Potts 1976:225.

Distribution: TX, Winkler Co.

Anomala umbra Casey 1915:16.

Anomala servilis Casey 1915:16. **New Synonymy.**

Distribution: DE, FL, GA, MD, MS, NC, NJ, and SC.

Anomala undulata Melsheimer 1844 (1845):140.

Anomala varians Burmeister 1844:248.
Anomala undulata dubia Blatchley 1910:984.
Anomala nigropicta Casey 1915:33. **New Synonymy.**
Anomala nigropicta canadensis Casey 1915:33. **New Synonymy.**
Anomala nigropicta floridana Casey 1915:33. **New Synonymy.**
Anomala nigropicta saginatula Casey 1915:34. **New Synonymy.**

Colonel Casey was sometimes capable of making a difficult situation nearly impossible. In this case, he took Melsheimer's name, *undulata*, and completely misapplied it to a minor variant of *innuba*, so that he could redescribe the veritable, and common

undulata as *nigropicta*, quite in spite of the fact that both Horn and Schaeffer had keyed the species properly (although Horn had mistakenly applied the name *minuta* to *innuba*). Nor is there any problem with Melsheimer's original description. While brief, it distinguishes *undulata* from *innuba*.

We found a considerable number of pre-Casey identifications of *undulata* properly identified to Melsheimer's species. Also, we checked the species and its relatives in Mexico and Central America, finding them all properly related to Melsheimer's *undulata*, and not to any *innuba* form. It is really rather amazing that so many made the mistake of following Casey rather than Schaeffer, Horn, and Melsheimer, but on the other hand it is a fair indication of the fact it is easy to be misled by carelss work.

Distribution: AL, AR, DE, DC, FL, GA, IL, IN, KS, KY, MD, MI, MS, MO, NJ, NC, OH, PA, SC, TN, TX, VA, WI, and Ontario.

Anomala of Baja California

It has been customary to include this area with the United States, although we see no real reason for continuing the tradition, and will treat the species more fully in the Mexican section of our study. However, to amend the record at this time for those collectors who still follow Leng's arrangement, we list:

Anomala centralis LeConte 1863:78.

Anomala raydoma Saylor 1948:354. **New Synonymy.**

Somehow Saylor also misapplied an established name, *centralis*, to *flavilla* Bates, calling it a subspecies, and then redescribed LeConte's species as new. LeConte clearly describes the triangular macula of *centralis*, a type of pronotal marking that is never even approached in *flavilla*, and Schaeffer's key is also perfectly clear in properly separating the two species.

Anomala peninsularis Schaeffer 1906:3.

Superficially similar to *flavipennis*, however distribution is much different and the large terminal articulated spine of the protibia is quite different from the extremely short and appressed spine of *flavipennis* and all its subspecies.

Literature Cited

Bates, Henry W. 1888. Biologia Centrali-Americana, vol. 2, pt. 2, 161—336.

Blatchley, Willis S. 1910. Coleoptera of Indiana, Bull. 1, Ind. Dept. Geol. & Nat. Res., 1386 pp.

Burmeister, Hermann C. C. 1844. Handbuch der Entomologie, Vol. 4, pt. 1. Berlin. 588 pp.

Casey, Thos. L. 1915. Memoirs on the Coleoptera, Vol. 6. I. A revision of the American species of Rutelinae, Dynastinae and Cetoniinae. Lancaster, Pa. pp. 1—394.

Drapiez, Pierre. 1820. Description de 5 especes d'insectes nouveaux, Ann. Gen. Sci. Phys., 7: 273—280.

Fabricius, Johann. 1787. Mantissa Insectorum, Hafniae. 348 and 382 pp.

Fabricius, Johann. 1792. Entomologia systematica. Hafniae, 330 and 538 pp.

Fabricius, Johann. 1798. Supplementum Entomologia systematica. Hafniae, 572 pp.

Germar, Ernst F. 1824. Coleopterorum Species novae, Halae. 624 pp.

Gyllenhal, Leonhard. 1817. In Schonherr's Synonymia Insectorum, Appendix, Skara. Vol. 1, pt. 3, 266 pp.

Hardy, Alan R. 1976. A new species of *Anomala* Samouelle from California Sand Dunes. Coleopt. Bull. 30(4):365—367.

Hayes, Wm. P. and J. W. McColloch. 1924. A new species of *Anomala*, Entomol. News, 35: 138—40.

Herbst, J. F. W. 1783 (1784). *IN* Füessly, J. C. Archiv der Insectengeschichte. Zürich and Winterthur. pp. 1—68.

Horn, George H. 1884. Notes on the species of *Anomala* inhabiting the United States. Trans. Amer. Entomol. Soc., 11: 157—164.

Howden, Henry F. 1955. Some new species and records of North American Scarabaeidae. Entomol. Soc. Wash., 57: 257—264.

Laporte, Francois Louis. 1840. Histoire naturelle des animaux articules. Paris. 324 and 564 pp.

LeConte, John L. 1854. Notice of some Coleopterous Insects. Proc. Acad. Nat. Sci., Phila., 7: 79—85.

LeConte, John L. 1863. New Species of North American Coleoptera. Prepared for the Smithsonian Institution. Smith. Misc. Coll., No. 167. pp. 1—86.

LeConte, John L. 1868. New Coileoptera collected on the survey for the extension of the Union Pacific Railway. Trans. Amer. Entomol. Soc., 2: 49—59.

LeConte, John L. 1878. Additional descriptions of new species. Proc. Amer. Philosoph. Soc., 17: 373—434.

Melsheimer, Friedrich E. 1844 (1845). Descriptions of new species of Coleoptera of the United States. Proc. Acad. Nat. Sci., Phila., 2: 134—160.

Nonfried, Anton F. 1894. Bescreibungen neuer Lamellicornier, etc. Ent. Nachr., 20: 113—142.

Potts, Robert W. L. 1974. Revision of the Scarabaeidae:Anomalinae. 1. The Genera Occurring in the United States and Canada. Pan-Pac. Entomol., 50: 148—154.

Potts, Robert W. L. 1976. New Species of North American *Anomala*. Pan-Pac. Entomol., 52(3): 220—226.

Robinson, Mark. 1938. Studies in the Scarabaeidae. 1. Trans. Amer. Entomol. Soc., 64: 107—115.

Robinson, Mark. 1941. Studies in the Scarabaeidae of North America. Trans. Amer. Entomol. Soc., 67: 127—136.

Say, Thomas. 1825. Descriptions of new species of Coleopterous Insects inhabiting the United States. Journ. Acad. Nat. Sci., Phila., 5: 160—204.

Saylor L. W. 1948. Contributions toward a knowledge of the Insect fauna of Lower California, No. 10, Coleoptera: Scarabaeidae. Proc. Calif. Acad. Sci., 4th ser., 24(10): 337—374.

Schaeffer, Charles. 1906. Notes on some species of the genus *Anomala* with descriptions of new species. Journ. New York Entomol. Soc., 14: 1—5.

Schaeffer, Charles. 1907. New Scarabaeidae. Journ. New York Entomol. Soc., 15: 60—75.

Schwarz, Eugene A. 1878. Coleoptera of Florida. Proc. Amer. Philosoph. Soc., 17: 353—472.

Scopoli, Johan A. 1763. Entomologia Carniolica etc. 420 pp.

Waterhouse, Charles O. 1875. On the Lamellicorn Coleoptera of Japan. Trans. Entomol. Soc., London. 1875: 71—116.

Wickham, Henry F. 1913. New North American Elateridae and Scarabaeidae. Psyche, 20: 27—31.

RECENT LITERATURE

Writing Scientific Papers in English. M. O'Connor and F. P. Woodford. American Elsevier Publishing Company, Inc., 52 Vanderbilt Ave., New York, N.Y. 10017. 1975. 116 pp. $7.95.